

CLAIMS

1. An apparatus for plugging a tubular bore, comprising:
  - a shaft member;
  - one or more cylindrical seals slideably disposed around the shaft member, wherein the shaft member passes axially through the one or more cylindrical seals;
  - one or more cylindrical sleeves slideably disposed around the shaft member and adjacent to the one or more cylindrical seals;
  - a flange attached at or near a distal end of the shaft member, wherein the flange retains the cylindrical sleeves and cylindrical seals on the shaft member; and
  - a pulling mechanism disposed at or near a proximal end of the shaft member.
2. The apparatus of claim 1, wherein the apparatus has two or more cylindrical seals, the cylindrical seals are separated by at least one of the one or more cylindrical sleeves.
3. The apparatus of claim 1, further comprising:
  - a pressure valve, wherein the shaft member is hollow and wherein the pressure valve is secured within the hollow shaft member at or near the proximal end of the shaft member.
4. The apparatus of claim 3, wherein the pressure valve is secured within the hollow shaft by threads.
5. The apparatus of claim 3, wherein the pressure valve is a pneumatic valve having a spring-loaded seal.
6. The apparatus of claim 1, wherein the shaft member is brass.
7. The apparatus of claim 1, wherein the shaft member is a metal.

8. The apparatus of claim 1, wherein the cylindrical seals are neoprene.
9. The apparatus of claim 1, wherein the cylindrical seals are a material selected from the group comprising an elastomer, rubber and synthetic rubber.
10. The apparatus of claim 1, wherein the cylindrical sleeves and the flange are a material selected from the group comprising brass, aluminum and combinations thereof.
11. The apparatus of claim 1, wherein the cylindrical sleeves and the flange are metal.
12. The apparatus of claim 1, wherein the cylindrical sleeves, the flange and the shaft member are made of different materials.
13. The apparatus of claim 1, wherein the pulling mechanism comprises a nut disposed on a threaded outer circumference of the proximal end of the shaft member.
14. The apparatus of claim 13, wherein the pulling mechanism further comprises a washer disposed adjacent to a distal end of the nut, wherein the washer diameter is greater than a diameter of the tubular bore.
15. The apparatus of claim 1, wherein the pulling mechanism causes the hollow shaft member to slide axially in a proximal direction within the one or more cylindrical sleeves and the one or more cylindrical seals.
16. The apparatus of claim 1, further comprising:  
one or more compressible sealant holders slideably disposed around the shaft member.
17. The apparatus of claim 16, wherein at least one end of the compressible sealant holder is adjacent to one of the one or more cylindrical sleeves.

18. The apparatus of claim 16, wherein the compressible sealant holder is a spring.
19. The apparatus of claim 16, wherein the compressible sealant holder is a wave spring.
20. The apparatus of claim 1, wherein a difference in a diameter of the one or more cylindrical sleeves and a diameter of the tubular bore is between about 0.02 inches and about 0.2 inches.
21. The apparatus of claim 1, wherein a difference in a diameter of the one or more cylindrical seals and a diameter of the tubular bore is between about 0.02 inches and about 0.2 inches.
22. The apparatus of claim 1, wherein a difference in a diameter of the one or more cylindrical sleeves and a diameter of the tubular bore is between about 0.03 inches and about 0.13 inches.
23. The apparatus of claim 1, wherein a difference in a diameter of the one or more cylindrical seals and a diameter of the tubular bore is between about 0.03 inches and about 0.13 inches.
24. A method, comprising:
- inserting an expandable plug into a tubular bore, wherein the expandable plug comprises a shaft member, one or more cylindrical seals slideably disposed around the shaft member, one or more cylindrical sleeves slideably disposed around the shaft member and a pulling mechanism secured to the shaft member;
  - compressing the one or more cylindrical seals;
  - sealing the tubular bore.

25. The method of claim 24, wherein the step of compressing the one or more cylindrical seals further comprises:

tightening a nut disposed on a threaded outer circumference of a proximal end of the shaft member, wherein the pulling mechanism comprises the nut and wherein the pulling mechanism exerts an axial force on the shaft member in a proximal direction to compress the one or more cylindrical seals.

26. The method of claim 24, further comprising:

inserting a sealant into a compressible sealant holder, wherein the sealant holder is slideably disposed around the shaft member and is adjacent to one of the one or more cylindrical sleeves;

compressing the sealant holder during the step of compressing the one or more cylindrical seals;

expelling the sealant from the sealant holder as the sealant holder compresses.

27. The method of claim 24, wherein the shaft member is hollow and wherein the expandable plug further comprises a pressure valve secured within the hollow shaft, the method further comprising:

opening the pressure valve before compressing the one or more cylindrical seals;

allowing a fluid in the tubular bore to flow through the pressure valve while compressing the one or more cylindrical seals.

28. The method of claim 27, further comprising:

determining the pressure within the tubular bore after sealing the tubular bore; and

adding additional fluid through the pressure valve to achieve a desired pressure within the tubular bore.

29. The method of claim 2, further comprising:

opening the pressure valve;

removing fluid through the pressure valve to achieve a desired pressure within the tubular bore.

30. A tool, comprising:

- a handle;
- a first threaded port on a first end of the handle;
- a pin secured in a center of the threaded port, wherein the pin is parallel to a wall of the first threaded port;
- a second port on a second end of the handle, wherein the first threaded port and the second port are in fluid communication.